PHILIP E. EGGERS et al. Application No.: 08/561,958 PATENT

On page 2,2, line 36, delete "current" and insert --

On page 23, line 12, delete the word "laser".

On page 32, line 31, insert --return-- before the word "electrode".

## IN THE CLAIMS:

Please cancel claims 1-22, 29, 30, 33, 36-38, and 57. Please amend claims 23-28, 31, 32, 34, 35, 39-56, 58 and 59 as follows. Please add claims 80-105. All claims have been set forth for convenience of reference.

Please cancel claims 1-22.

(Twice Amended) A method for applying energy to a target site on a patient body structure comprising:

providing an [active] electrode <u>terminal</u> and a return electrode electrically coupled to a high frequency voltage source:

positioning the active electrode in close proximity to the target site in the presence of an electrically conducting terminal [liquid]; and

applying a high frequency voltage between the [active] electrode terminal and the return electrode, the high frequency voltage being sufficient to vaporize the fluid [liquid] in a thin layer over at least a portion of the [active] electrode terminal and to induce the discharge of energy to the target site in contact with [from] the vapor layer.

24. (Twice Amended) The method of claim 23 wherein the [active] electrode terminal comprises an electrode array including a plurality of isolated electrode terminals.

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PATENT PHILIP E. EGGERS et al. Application No.: 08/561,958 Page 3 (Amended) The method of claim 23 wherein [the] at 1 least a portion of the energy induced [from the vapor layer] is 2 in the form of photons having a wavelength in the ultraviolet 3 spectrum. 26. (Amended) The method of claim 23 wherein at least a portion of the energy [induced from the vapor layer] is in the form of energetic electrons. (Amended) The method of claim 24 wherein the 1 isolated electrode terminals each have a contact <u>surface</u> area <u>in</u> 2 the range of about 0.25 mm<sup>2</sup> to 50.0 mm<sup>2</sup> [below 15 mm<sup>2</sup>]. 3 The method of claim 24 wherein the isolated 28. (As Filad) 1 electrode terminals have circular contact surfaces with an area in the range 2 from 0.01  $mm^2$  to 1  $mm^2$ . 3 Please cancel claims 29 and 30. (Amended) The method of claim 24 wherein the 5 32. electrode terminals are spaced from each other a distance of 2 about 0.0005 to 2.0 [5 to 0.01] mm. 3 The method of claim 24 wherein the electrode (As Filed) 1 array is disposed over a distal tip of an electrosurgical probe. 2 Please cancel claim 33% The method of claim 24 wherein the electrode 1 terminals comprise a material with a relatively low thermal conductivity. 2 The method of claim 34 wherein the electrode 35. (As Filed) 1 materials comprise a material selected from the group consisting of titanium, 2 tungsten, platinum, aluminum and tantalum. 3 Please cancel claims 36-38.

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1	(Amended) The method of claim 23 wherein the high	
2	frequency voltage is at least 200 [300] volts peak to peak.	
124 1	/8 40. (Amended) The method of claim 23 wherein the	
2	voltage is in the range from 500 [600] to 1400 volts peak to	
3	peak.	<u> </u>
	(Amuded)  [9 AT. (As Filed) The method of claim 23 wherein the	
184 z	[active] electrode terminal is positioned between 0.02 to 5 mm	
100 3	from the target site.	
,- ,	110 6110 6110 6110	
	20 42. (Amended) The method of claim 23 wherein the	
25	vapor layer has a thickness of about 0.02 to 2.0 mm [10 to 400	
$\beta$ $\frac{2}{3}$	micronsl.	
ې	microns;	<u> </u>
-	عماد (Twice Amended) The method of claim عماد wherein	
1	the distance between the most proximal portion of the [active]	
16 2	electrode terminal [surface] and the most distal portion of the	
12 3	return electrode is [surface are spaced apart by a distance] in	
4	11	
5	the range from 0.5 [1] to 10 mm.	ļ.
	(As Filed) The method of claim 24 wherein the return	
1 2	electrode has a distal end positioned proximal to the electrode array.	
	electione has a discur cha positional particular and positional partic	
1	2245. (Twice Amended) The method of claim 23 wherein	
2	the [active] electrode terminal [surface] and the return	
- 1 3	electrode are of comparable size and comprise a bipolar array of	
12/1	isolated electrode terminals which both come in close proximity	
	or in contact with the body structure.	
5 	BY IN CONCACT WICH the Day Bergerage.	<u> </u>
	23 46. (Amended) The method of claim 28 wherein the	+
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/ <sup>2</sup>	liquid phase of the electrically conducting fluid [liquid] has a	
$\Omega^{6}$	conductivity greater than 2 mS/cm.	
<i>[</i> 2	(Amended) The method of claim 23 wherein the	
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. 2	liquid phase of the electrically conductive fluid [liquid]	
3	comprises isotonic saline.	+
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PATENT PHILIP E. EGGERS et al. Application No.: 08/561,958 Page 5 28 (Twice Amended) A method for applying energy to a 1 target site on a patient body structure comprising: 2 providing an [active] electrode terminal and a return 3 electrode electrically coupled to a high frequency voltage 4 5 source; positioning the [active] electrode terminal in close 6 proximity to the target site in the presence of an electrically 7 conducting fluid [liquid]; and 8 applying a high frequency voltage between the [active] 9 electrode terminal and the return electrode, the high frequency 10 voltage being sufficient to impart sufficient energy into the 11 target site to ablate [several cell layers of] the body structure 12 without causing substantial tissue necrosis below the surface of 13 the body structure underlying the ablated body structure [beyond 14 the several cell layers]. 15 The method of claim 48 wherein the (Amended) applying step comprises: 2 vaporizing the electrically conducting fluid [liquid] 3 in a thin layer over at least a portion of the [active] electrode 4 terminal [surface]; and 5 inducing the discharge of photons to the target site in 6 contact with [from] the vapor layer. (Amended) The method of claim 48 wherein the 1 applying step comprises: 2 vaporizing the electrically conducting fluid [liquid] 3 in a thin layer over at least a portion of the active electrode 4 5 surface; and inducing the discharge of energetic electrons to the 6 target site in contact with [from] the vapor layer. 7 (As Filed) The method of claim 48 wherein the depth of 51. l necrosis is 0 to 400 microns 2

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26 30 52. (Twice Amended) A method for applying energy to a target site on a patient body structure comprising:

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electrically coupled to a h

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providing an active electrode and a return electrode electrically coupled to a high frequency voltage source;

positioning the [active] electrode <u>terminal</u> in close proximity to the target site in the presence of an electrically conducting <u>fluid</u> [liquid]; and

applying a high frequency voltage between the [active] electrode terminal and the return electrode, the high frequency voltage being in the range from 500 [600] to 1400 volts peak to peak.

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53. (As Filed) The method of claim 52 wherein the high frequency voltage is in the range from 700 to 900 volts peak to peak.

1 2 32 54. (Twice Amended) A method for applying energy to a target site on a patient body structure comprising:

3 4 providing an active electrode electrically coupled to a high frequency voltage source;

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positioning the [active] electrode <u>terminal</u> in close proximity to the target site in the presence of an electrically conducting <u>fluid</u> [liquid]; and

8 9 generating a voltage gradient between the [active] electrode terminal and tissue at the target site, the voltage gradient being sufficient to create an electric field that cause the breakdown of [breaks down the] tissue through molecular dissociation or disintegration

33 555. (Twice Amended) The method of claim 54 wherein the generating step comprises:

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providing a return electrode electrically coupled to a high frequency voltage source;

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applying a high frequency voltage between the [active] electrode terminal and the return electrode; and

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vaporizing the electrically conducting <u>fluid</u> [liquid] in a thin layer over at least a portion of the [active] electrode <u>terminal</u> [surface].

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(Amended) The method of claim 55 further comprising developing a film layer of vapor between the active electrode and the body structure [tissue] at the target site.

Please cancel claim 57.

comprising cooling the tissue with the electrically conducting fluid [liquid] to reduce the temperature rise of those portions of the body structure adjacent the target site [shield the tissue from the high frequency voltage].

cooling step includes translating the distal <u>surface</u> [tip] of the <u>electrode terminal</u> [probe] over the target site to allow the electrically conducting <u>fluid</u> [liquid] to contact the tissue after the tissue has been subjected to the <u>electric field</u> [high frequency voltage].

Please cancel claims 60-79, as they have been restricted out.

Please add claims 80-105.

electrode height of the most distal portion of the electrode terminal relative to the most proximal portion of the electrode terminal exposed to the electrically conducting fluid is in the range from 0.0 to 2.0 mm.

electrode terminal is surrounded and supported by an insulating matrix at or near the distal tip of the probe to electrically isolate the proximal portion of the electrode terminal from the electrically conductive fluid, the insulating matrix comprising an inorganic material.

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(New) The method of claim at wherein the inorganic material is selected from the group consisting essentially of ceramic, glass and glass/ceramic compositions.

electrode height of the most distal portion of any of the electrode terminals relative to the most proximal portion of said electrode terminals exposed to the electrically conducting fluid is in the range from 0.0 to 2.0 mm.

electrode terminals are surrounded and supported by an insulating matrix at or near the distal tip of the probe to electrically isolate proximal portions of the electrode terminals from the electrically conductive fluid, the insulating matrix comprising an inorganic material.

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(New) The method of claim 84 wherein the inorganic material is selected from the group consisting essentially of ceramic, glass and glass/ceramic compositions.

(New) The method of claim 81 wherein the distal surface of the electrode terminal is recessed below the surface of the insulating matrix by a distance from 0.01 mm to 1.0 mm.

(New) The method of claim of wherein the distal surface of the electrode terminal is flush with the surface of the insulating matrix.

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electrode terminal comprises an electrode array including a plurality of isolated electrode terminals.

42 AND

generating step comprises:

providing a return electrode electrically coupled to a higher frequency voltage source;

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applying a high frequency voltage between the return electrode and the array of electrode terminals; and

vaporizing the electrically conducting fluid in a thin layer over one or more of the electrode terminals of the array.

90. (New) The method of claim 89 further comprising developing a film layer of vapor between one or more of the electrode terminals and the target site.

(New) The method of claim 89 further comprising cooling the tissue with the electrically conducting fluid to reduce the temperature rise of those portions of the body structure adjacent the target site.

92. (New) The method of claim 26 wherein the energy of the energetic electrons is sufficient to cause disassociation or disintegration of molecules of the body structure.

(New) The method of claim 26 wherein the energy evolved by the energetic electrons is greater than 3eV.

94. (New) The method of claims 23 and 35 wherein the density of the vapor layer is less than about 1020 atoms/cm3.

(New) The method of claims 23 and 50 wherein the electrode terminal is configured to promote bubble nucleation causing the formation of the vapor layer.

(New) The method of claims 23 and 48 wherein the electrode terminal has a contact surface area in the range of about 0.25 mm<sup>2</sup> to 50 mm<sup>2</sup>.

(New) The method of claims 48 and 52 wherein the high frequency voltage is at least 200 volts peak to peak.

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The method of claims 48 and 52 wherein the (New) high frequency voltage is in the range from about 500 to 1400

The method of claims 48 and 52 wherein the (New) electrode terminal is positioned between 0.02 to 2.0 mm from the target site.

550 26 514 The method of claims 48 and 52 wherein the 100 (New) electrode terminal and the return electrodes comprise a bipolar array of isolated electrode terminals.

The method of claims 23 and 48 further comprising cooling the tissue with the electrically conducting fluid to reduce the temperature rise of those portions of the body structure adjacent the target site.

23 20 The method of claim 101 wherein the cooling 102. (New) step includes translating the distal surface of the active electrode over the target site to allow the electrically conducting fluid to contact the tissue after the tissue has been subjected to the electric field.

The method of claims 23 and 48 further 103. (New) comprising evacuating fluid generated at the target site with a suction lumen having a distal end adjacent the electrode terminal.

50 86 104. (New) The method of claims 23 and 48 wherein the target site is a tumor within or on the patient's body.

The method of claims 48 and 5% wherein (New) the electrode terminal comprises an electrode array including a plurality of isolated electrode terminals .--